AUGUST KEKULÉ.

By the death of this eminent chemist at the age of sixty-six, which took place on July 13, science loses one of her most distinguished votaries. It is only four years ago since a remarkable demonstration was held in Bonn in celebration of the twenty-fifth year of Kekulé's professorship in that University. Two years previously, in March 1890, a similar rejoicing had been held in Berlin in honour of the twenty-fifth anniversary of the promulgation of the benzene theory by its illustrious author. It appears that Kekulé was intended by his father to have been an architect, and for that purpose he was sent to Giessen to become proficient in the subject after having undergone a preliminary training of the ordinary kind at the Darmstadt Gymnasium. At Giessen he came under the powerful spell of Liebig, and having attended some lectures on chemistry by that great master, his inclination towards the adoption of this science as a profession instead of architecture appears to have received a strong impulse. After a short period of probation at the Darmstadt Polytechnicum, where he tells us he learnt chemistry under Moldenhauer, and spent his leisure in lathe-turning and modelling in plaster, he returned to Giessen and entered as a student under Liebig and Will. Even at this stage of his career he appears to have been capable of rendering material assistance to his master in the experimental work being carried on in connection with the familiar "Letters on Chemistry," in which Liebig includes the name of Kekulé among those of many other chemists now well known in science, in acknowledgment of the services rendered by the future founder of structural organic chemistry. That Liebig thought highly of his pupil may be inferred from the circumstance that he very nearly received the appointment of assistant in the Giessen laboratory, then renowned throughout Europe for the chemical work being carried on there. Instead of remaining at Giessen, however, young Kekulé went to Paris, and having sat at the feet of Regnault, Frémy and Wurtz, he was casually attracted by a course of lectures on chemical philosophy advertised by Gerhardt, who had resigned his professorship at Montpellier, and was giving private courses of instruction in the French capital. Gerhardt appears also to have recognised the capabilities of his student, and an intimate personal friendship sprang up between them. It is probable that this contact with Gerhardt acted as a stimulus in developing the particular faculty as a theoriser which must have been inherent in Kekulé, and which found expression in all his later work. From Paris, where he declined an invitation to become Gerhardt's assistant, he went for a short time to Switzerland as assistant to Von Plantu in the Castle of Reichenau. After this Swiss sojourn, and chiefly at the instigation of Bunsen, he accepted an offer from the late Dr. Stenhouse, then at St. Bartholomew's Hospital, and for a time this country had the honour of fostering young Kekulé. The bent of his mind in the direction of chemical theory is well brought out by his confession in later life that he did not derive much profit from his experience at St. Bartholomew's; but having become acquainted with Williamson, who had just completed his classical work on etherification, he appears to have found a more congenial outlet for his energies in the school of thought being evolved by that investigator and Odling, and which he declared, in 1892, to have been an excellent school "for the encouragement of independent thought." While in this country an offer was made to Kekulé that he should remain here as a technologist, but the Fatherland had greater attractions for him; his great ambition was to become attached to a German University, and he started a small laboratory in the house of a corn merchant in the main street of Heidelberg, where he received pupils. In these days of palatial laboratories, it is interesting to recall that in this little kitchen Kekulé carried out his work on the fulminates, and that Baeyer, then one of his pupils, conducted his researches on cacodyl. It is not the laboratory that makes the chemist!

Kekulé's first call as ordinary professor was to Ghent, where the Belgian Prime Minister was instrumental in getting him a modest laboratory; and here for nine years he worked with a success that can be measured by the fact that, in addition to Baeyer, he numbered among his pupils Ladenburg, Victor Meyer, Wichelhaus, and others whose names are as household words in the annals of chemical science. From Ghent he was "called" to Bonn, in which University the magnificent laboratories grew under his inspiring influence, and where he remained till the last, adding to the lustre of his reputation and shedding the light of his intellect over that country in which modern chemistry appears to have found its headquarters.

As an experimentalist, Kekulé's contributions to science are not great as compared with the enormous influence which his genius for theorising has exerted upon the development of the science of the century. His greatest and most precious gift was his power of penetrating into the inner mysteries of molecular constitution, and it is through this work that his name will ever be revered. It was Kekulé who first gave definite form to Frankland's conception of valency, and his application of this idea to the study of the carbon compounds was nothing less than epoch-making. Out of this conception grew the famous theory of cyclic compounds, which has been prolific to an extent almost unparalleled in the history of pure science, and which from the practical side has made Germany what it is in the domain of organic chemical technology. If the life-work of any chemist of our age need be quoted as a standing protest against the *cui bono* attitude of mind which we in this country are still suffering under, and which relegates abstract theoretical studies to the realms of "academic" thought remote from human interests, let the speculations of August Kekulé be put forward as an answer crushing and complete for all time.

The present writer never had the privilege of coming into personal contact with the master-thinker who has so recently passed away. His geniality of disposition appears to have endeared him to all who came under his influence. The chemists of this country join with those of the Fatherland in mourning over the gap that has been caused in their ranks. R. M.

NOTES.

The International Geological Congress will hold its seventh session at St. Petersburg at the end of August next year, under the acting presidency of Dr. A. Karpinsky, and with the Grand Duke Constantine as honorary president. The session will continue about a week, and the proceedings of the Congress will not be divided into sections, as at Zürich, but will be devoted chiefly to the discussion of broad principles. Extended excursions are announced, the most important being to the Ural Mountains before, and to the Caucasus after, the meeting at St. Petersburg. Shorter excursions have also been arranged to Finland and elsewhere. Geologists who propose to attend this meeting should send notice of the excursions in which they wish to participate, before next October, to the General Secretary of the Congress. The Emperor of Russia has decided, on the favourable report of the Minister of Public Ways, to grant to all geologists duly enrolled for the meeting, free first-class railway tickets during their sojourn in Russia.

The forty-second annual meeting of the German Geological Society will be held at Stuttgart, on August 9-12. Another important annual meeting is that of the German Anthropological Society, which takes place on August 3-6, at Spires.

The Royal Institution of Science, Letters, and Arts of Venice offers a prize of 3000 lire for the best essay on the alluvial matter brought down from the Alps by one of the principal rivers of Venetia. The competition remains open till December 31, 1896.

An effort is to be made to induce the Prince of Wales to place himself at the head of the movement for celebrating at Bristol, in June next year, the 400th anniversary of the discovery of North America by John and Sebastian Cabot, who sailed from Bristol. It is hoped that the foundation-stone of the memorial will be laid by the Prince of Wales simultaneously with one laid in Canada.

The International Congress of Applied Chemistry was opened in Paris on Monday. Sixteen hundred delegates were present, of whom six hundred were from other countries. M. Berthelot, Perpetual Secretary of the Academy of Sciences, was elected President of the Congress, and delivered a powerful inaugural address, in the course of which he dwelt particularly on the relation between pure and applied science, the remarkable results obtained by the alliance of physics and chemistry, and the beneficent part that science has played in the history of the past three-quarters of a century.

The Russian Geographical Society has awarded this year its Constantine medal to M. A. Rykacheff, for his work in the domain of physical geography. Beginning in the year 1874 with a work on the distribution of atmospheric pressure in Russia, he continued to publish a series of researches on the diurnal variations of pressure, the prevailing winds of the Caspian and the White Seas, the tides in the atmosphere, the freezing and thawing of the Russian rivers, the variations of the levels of rivers in Middle Russia, in connection with variations in the amounts of rain and snow, the diurnal variations of temperature over the tropical oceans, &c. A full list of M. A. Rykacheff's works, mostly written in German and French, is given in the yearly Report of the Society. The Count Lütke medal has been awarded to Admiral Makaroff, for his work on the temperature and density of water in the Northern Pacific, based on the measurements made in 1886–89 on board the *Vityaz*. His maps of the distribution of surface temperature in August, and of temperature at a depth of 400 metres, are especially worthy of notice. The Prjevalsky prize was awarded to M. Berezovsky, for his explorations of the northern borderlands of Tibet. A Prjevalsky medal was awarded to J. A. Schmidt, for his twelve geodetical expeditions to different parts of Central Asia and Siberia; and one to Dr. H. A. Fritsche, for his magnetic measurements in China, Mongolia, Siberia, and Russia. Two small gold medals were awarded to F. F. Müller, for his magnetical work in East Siberia; and to A. A. Lebedintseff, for his researches into the chemical composition of water in the Black and Azov Seas. Eighteen silver medals were awarded for various works of lesser importance.

A full description of the cell invented by Dr. W. W. Jacques, for the production of electricity by the consumption of carbon, is given in the July number of the *Engineering Magazine*, by Mr. G. H. Stockbridge. The apparatus consists of a pot of pure iron surrounded by a suitable furnace and containing caustic soda, in which hangs a rod or cylinder of carbon. The carbon must be in such a state that will serve as a good conductor of electricity. Gas, carbon, and charcoal are available without special treatment; but anthracite coal has to be baked to give it the requisite conductivity, and bituminous coal needs, for the same purpose, to have some of its hydrocarbons driven off. Commercial caustic soda can be used without expelling the usual impurities. Air is forced through the caustic soda by means of an air-pump. To set the cell in operation the furnace and its enclosed generator containing the caustic soda is brought to a temperature of 400° to 500° C., and the air-pump is put in action. The caustic soda takes up oxygen from the air, and releases it at the carbon. The carbon is attacked by the oxygen, and suffers a gradual consumption as long as the operation continues, an electric current being produced as a result of the action, the poles being the iron pot and the carbon rod. Some electricians say the current is only a thermo-electric one. The cell is said to have an efficiency of eighty-five or ninety per cent. This efficiency does not, however, take into account the expenditure of heat for maintaining the cell at a suitable temperature, or of the power used in running the air-pump which supplies it with oxygen. Dr. Jacques' cell is an interesting addition to the list of others devised to obtain electricity as a direct result of the consumption of carbon; but whether it will become of practical value, cannot yet be decided.

It seems as if the Boltzmann-Maxwell distribution of the kinetic theory of gases is likely to become an everlasting bone of contention. A short time ago we chronicled in these columns an attack on Maxwell's original proof by M. Bertrand in the *Comptes rendus*, on the ground that the proof assumed independence of the frequencies of distribution of the velocity-components of a molecule of the gas resolved in three directions at right angles. This paper called forth a rejoinder from Prof. Boltzmann, inviting M. Bertrand to examine Maxwell's later proofs. M. Bertrand replied that he considered these even worse than the first. Dr. Carlo del Lungo, writing in the *Atti dei Lincei* in defence of the proof first objected to by M. Bertrand, now endeavours to prove that the assumed independence of distribution of velocities is a necessary consequence of the principles of conservation of momentum and of energy. It certainly seems impossible to give a rigorous proof of the Boltzmann-Maxwell distribution without making *some* assumption beyond the ordinary principles of pure dynamics (*e.g.* the assumption that the only intermolecular forces are those due to impact). But Dr. del Lungo also upholds the view that the general evidence in favour of the law lies in the fact that the distribution in question satisfies so many conditions which are not satisfied by any other distribution, and which represent more or less closely the phenomena present in gases.

Dr. A. Lampa, working in the laboratory of Prof. Franz Exner, has determined the refractive indices of a number of substances for electric waves of very small length. The experiments, which form the subject of a communication to the *Wiener Sitzungsberichte*, were made with electromagnetic radiations of 8 mm. wave-length; this number being ascertained both from the dimensions of the excitor and by diffraction observations. The wave-length in question corresponds to the frequency $N = 37\cdot500 \times 10^6$, and Dr. Lampa gives the following values for the index n: Paraffin, 1·524; ebonite, 1·739; crown glass, 2·381; flint glass, 2·899; sulphur, 1·802; benzole, 1·767; glycerine, 1·843; oil of turpentine, 1·782; oil of vaseline, 1·626; oil of almonds, 1·734; absolute alcohol, 2·568; and distilled water, 8·972.

M. L.-A. Marmier, of the Pasteur Institution, has communicated to the Société Française de Physique the results of an interesting series of experiments on the action of currents of high frequency on microbian poisons. It had been previously announced by MM. d'Arsonval and Charrin that such currents affect these poisons to a considerable extent, and M. Marmier has examined whether this modification is a new phenomenon, or merely a secondary result of well-known effects of the current. It is found that the alteration in question only occurs when the liquids are allowed to become heated to a temperature which would alone suffice to modify the poisons. When the liquids are kept cool by suitable precautions, no modification takes place, and M. Marmier concludes that currents of high frequency do not themselves affect microbian poisons. The experiments were performed on the toxin of diphtheria, that of tetanus, and the venom of the cobra snake.

In the June number of the *Annalen der Hydrographie* there is an interesting discussion, by H. Haltermann, of the occurrence of St. Elmo's Fire at sea, based upon observations in the log-books received at the Deutsche Seewarte. The tables contain full details as to position, conditions of weather, &c. During more than 77,000 days of observation, the phenomenon was observed 164 times, 87 times in north, and 77 times in south latitude. Its occurrence differs very considerably in different parts of the ocean, *e.g.* in the ten-degree square lying between the equator and 10° N. lat., and between 20° and 30° W. long., St. Elmo's Fire was observed about three times per 1000 days, while in the two squares lying between 50° and 60° S. lat. and 60° and 80° W. long. it occurred six times per 1000 days. The more frequent occurrence at sea than on land is attributed to the fact that the accumulating electricity is more easily conducted by the numerous objects projecting into the air over the land.

On July 2, Prof. Wiesner presented to the Vienna Academy of Sciences an investigation on the important relation of plant-life to photo-chemical climate, based on observations made at Vienna, Buitenzorg (Java), and Cairo. The measurements of the chemical intensity of light were made by a process corresponding in principle to the photographic method of Bunsen and Roscoe. The following are the principal results arrived at: (1) The greatest chemical intensity of light at Vienna amounted (in Bunsen-Roscoe units) to 1·500, and at Buitenzorg to 1·612. (2) The average ratio of the noon intensity to the daily maximum at Vienna was as 1 : 1·08, and at Buitenzorg as 1 : 1·22. (3) At Vienna the yearly noon intensity varied in the proportion of 1 : 214, and at Buitenzorg, in the proportion of 1 : 124. (4) As a rule the daily maximum at Vienna occurred about noon, and at Buitenzorg in the late forenoon. This explains the relatively high maxima at Vienna, and the relatively low maxima of Buitenzorg. In clear or uniformly cloudy weather, the maximum occurred generally at noon at both places. (5) At Cairo a strong depression of the daily curve of intensity was observed at noon, during a perfectly clear sky. This depression was also observed on rare occasions at Vienna, but to a smaller extent. (6) At Buitenzorg the chemical intensity of light was generally greater in the forenoon than in the afternoon. At Vienna this excess was greatest in June and July; the morning intensities were generally higher than the corresponding evening intensities, even when the sky was similarly clouded.

General Pyevtsoff, who has had great experience in the measurement of altitudes in Central Asia with the barometer, publishes in the *Memoirs* of the Russian Geographical Society a very valuable paper on barometrical levellings, in which he points out once more the degree of precision that can be obtained from such measurements. He discusses separately the errors in the calculated altitudes which are due to disturbances in the atmosphere resulting from cyclonic and anticyclonic air-movements, to the error in the determination of the average temperature of the air between the two stations at which the barometer has been simultaneously observed, &c., and he gives their relative importance under different circumstances. The most valuable part of the author's inquiry is the comparison which he has made between the real differences of altitudes of twenty-eight different meteorological stations, situated at distances of from 67 to 270 miles from each other, and the altitudes which are obtained day by day from a comparison of the readings of the barometer at the stations, taken in pairs. It appears, as a rule, that if the readings on the days of great atmospheric disturbances are not taken into account, the results are most satisfactory, and that the errors, due to an unequal distribution of pressure at the two stations, seldom exceed 100 feet, and only occasionally attain 140 feet, even for stations taken so wide apart as 100 and 270 miles. As to the altitudes determined in Central Asia, they very seldom exhibit errors exceeding 300 to 400 feet, which evidently is, for separate places, a quite sufficient approximation. At the end of his memoir, General Pyevtsoff gives new tables, based on Babinet's formula, for the calculation of altitudes without the aid of logarithms, which tables combine great accuracy with rapidity, and are very practically arranged.

The extension of the use of pure yeasts has not unnaturally caused a good deal of attention to be of late bestowed upon the most efficient methods, both for their successful preservation and transmission. Pure yeast cultures can be purchased much as any other article of commerce at the present day, but a great deal depends upon how these so-called stock yeasts can be stored. Experience has shown that, in general, solutions of cane-sugar answer far better for this purpose than wort-gelatine or infusions of wort. In saccharine solutions, yeasts have been preserved in perfect condition for as long as fourteen years. There are, however, exceptions to this rule, for Hansen reports that the *Saccharomyces Ludwigii* dies off in from two to three years when kept in saccharine solutions; whilst Dr. Holm has quite recently described a particular variety of yeast obtained from some Jamaica molasses, which could not be persuaded to exist beyond twelve months in such solutions, whilst in wort-infusions it was still alive after the lapse of two and a half years. With these exceptions, however, saccharine solutions answer the purpose perfectly; but it is of great importance that vessels containing these stock yeasts, whilst occupying very little space, should obviate as far as possible the evaporation of the contents. This evaporation has caused no little trouble in the past; but, thanks to an ingenious device of Jörgensen's, it appears to be happily overcome. The apparatus employed has been recently described by Dr. Holm, to whom the conduct of the experiments involved in determining this point were entrusted, and his paper appears in the *Centrablatt für Bakteriologie*, part ii. Not only may the special flasks described be used for liquids, but they have been found also of great service in preserving gelatine cultures from drying up, and Dr. Holm tells us that, even six months after its preparation, the gelatine in these flasks still retained its soft consistency, and was not in this respect distinguishable from freshly prepared gelatine. This should overcome a difficulty with which bacteriologists are frequently troubled.

In the summer of 1893, two of von Rebeur-Paschwitz's horizontal pendulums were erected at the observatory of Charkow, and the reports on the observations made with them are being issued by Prof. G. Lewitsky, now director of the Dorpat Observatory. The first pamphlet, consisting of sixty-three pages, is one of the most valuable contributions to the study of earthquake-pulsations so far published. It contains detailed records of 139 series of pulsations between August 4, 1893, and October 9, 1894, the time and amplitude of each marked phase being given, as well as the epochs of the beginning and end of the movement. The duration of some of the disturbances is extraordinary. Thus, the oscillations due to the Greek earthquakes of April 20 and 27, lasted for 14h. 50m. and 12h. 35m. respectively, and those from the Constantinople earthquake of July 10 for 13h. 26m. In these cases, however, the epicentre was not at a great distance. Turning to others of remoter origin, we find that the Japanese earthquake of March 22 affected the pendulum for 10h. 14m., and the Venezuelan earthquake of April 28 for as much as 10h. 30m.

WE notice in the Moscow geographical review, *Earth Knowledge* (*Zemlevedenie*), a very valuable paper, by M. Alboff, "On the Vegetation of West Caucasia." The paper is an introduction to his recently-published great work, "Prodromus Floræ Colchidæ."

THE Director of the Geodynamic Section of the Observatory of Athens has sent us the *Bulletin Mensuel Seismologique* for February, March, and April of the present year. The fact that these three numbers contain records of 147 earthquakes in Greece and the Ionian Islands, shows what an admirable field for study is placed before Dr. Papavasilion. Many of these shocks occurred in districts which have been recently visited by severe earthquakes, no less than sixty-six having been felt in Zante alone.

THE *Proceedings* of the Edinburgh Mathematical Society for the Session 1895–96 have just been published. Among the papers is one having an application to optical instruments, viz., "A summary of the theory of the refraction of thin approximately axial pencils through a series of media bounded by coaxial spherical surfaces, with application to a photographic triplet, &c.," by Prof. Chrystal. Prof. G. A. Gibson contributes to the volume an interesting descriptive review of Prof. Cantor's "Vorlesungen über Geschichte der Mathematik," with special reference to the rise of the infinitesimal calculus, and the Newton-Leibnitz controversy. There is also a paper on "The number and nature of the solutions of the Apollonian contact problem," by Mr. R. F. Muirhead, and others on "Symmedians of a triangle and their concomitant circles," by Dr. J. S. Mackay, and "On deducing the properties of the trigonometrical functions from their addition equations," by Mr. Muirhead.

FOUR parts of the *Transactions* of the Royal Society of Edinburgh, embracing the period 1893–95, are among recent publications. As we regularly print reports of papers read at the Edinburgh Royal Society, it is unnecessary to do more now than refer to a few of those published in the present parts of the *Transactions*. A paper, by Mr. Aitken, on dust particles, and the relation between them and meteorological phenomena, appears in part iii. of vol. xxxvii.; which also contains papers on the fossil flora of the South Wales coal-field, by Mr. R. Kidston, and on the variations of the amount of carbonic acid in the ground-air, by Dr. C. Hunter Stewart. The following part of the same volume has papers on the partition of a parallelepiped into tetrahedra, by Prof. Crum Brown; on the manganese oxides and manganese nodules in marine deposits, by Dr. John Murray and Mr. Robert Irvine; and on the chemical and bacteriological examination of soil, with special reference to the soil of graveyards, by Dr. J. Buchanan Young. The greater portion of part i. (vol. xxxviii.) is taken up with Dr. H. R. Mill's elaborate paper on the distribution of temperature in the Clyde Sea area. The paper is accompanied by thirty-two plates, most of them containing several coloured diagrams, and it is altogether a monument of painstaking observation and careful work. Among the remaining contents of the same publication are papers on bird and beast in ancient symbolism, by Prof. D'Arcy Wentworth Thompson, jun.; two glens (Glen Aray and Glen Shira), and the agency of glaciation, by the Duke of Argyll; and on the relation between the variation of resistance in bismuth in a steady magnetic field, and the rotatory or transverse effect, by Mr. J. C. Beatie. In part ii. of vol. xxxviii. are two extremely important papers, one on specific gravities and oceanic circulation, by Dr. Alex. Buchan; and the other on deep- and shallow-water marine fauna of the Kerguelen region of the great Southern Ocean, by Dr. John Murray. Dr. Buchan's paper is accompanied by nine maps, showing the specific gravity of the oceans at observed temperatures from the surface to a depth of 2000 fathoms. An immense amount of material has thus been brought together for the benefit of oceanographers.

AN important source of vanadium compounds has lately been discovered in South America. In the high plateaus of the Andes, at a height of about 16,000 feet, there exists a mine of anthracite containing vanadium. The coal from this mine, which is easily worked, burns easily, leaving about two per cent. of ash. This ash contains one-seventh to one-quarter of its weight of vanadium, besides some silver, with traces of zirconium and platinum. The extraction of the vanadium on the large scale has been accomplished by M. K. Hélouis, who has applied it to the preparation of aniline black, to the colouring of porcelain, and in metallurgy. The vanadium used by M. Moissan in the preparation of vanadium carbide came from this source.

IN the current number of the *Berichte* there is an account, by Mr. O. Piloty, of a new method of preparing the salts of hyponitrous acid, for which it is claimed that the yield is in advance of all methods previously described. Hydroxylamine hydrochloride, by treatment in alcoholic solution with sodium ethylate and benzene-sulphonic chloride, is converted into benzene sulphonehydroxylamine, $C_6H_5.SO_2.NH.OH$, and this, on treatment with concentrated potash solution, gives the potassium salts of benzene-sulphonic and hyponitrous acids, which can be separated without difficulty. The mechanism of the reaction is precisely analogous to the production of hyponitrite from potassium hydroxylamine mono-sulphonate, discovered by Divers and Haga (*Jour. Chem. Soc.*, 1889, p. 760). In a subsequent note, referring to the preliminary note by Hantzch, stating that anhydrous hyponitrous acid can be obtained, Mr. Piloty describes the results obtained by him in this direction. Silver hyponitrite, suspended in ether and treated with hydrogen chloride, gives silver chloride and a solution of $H_2N_2O_2$ in ether. Rapid evaporation of the ether causes the deposition of the acid as an oil, which solidifies to a crystalline mass in a freezing mixture. As might be expected, both the oil and solid possess highly explosive properties. Of the numerous isomerides of the formula $H_2N_2O_2$ theoretically possible, this is the second to be isolated, the nitramide NH_2NO_2 of Thiele and Lachman being the first.

THE additions to the Zoological Society's Gardens during the past week include a Barbary Ape (*Macacus inuus*, ♀) from North Africa, presented by Mr. E. G. Walls; a Bonnet Monkey (*Macacus sinicus*, ♀) from India, presented by Mr. P. Clarke; two Macaque Monkeys (*Macacus cynomolgus*, ♂ ♀) from India, presented by Mrs. Williamson; an Ocelot (*Felis pardalis*) from Trinidad, presented by Mr. H. O. Nicholls; a Black-tailed Flower-Bird (*Anthornis melanura*) from New Zealand, presented by the Hon. Walter Rothschild; a New Zealand Parrakeet (*Cyanorhamphus novæ-zealandiæ*) from New Zealand, presented by Miss A. Malcolm; a Bare-eyed Cockatoo (*Cacatua gymnopis*) from South Australia, presented by Mrs. M. E. Huntley; a Boobook Owl (*Ninox boobook*) from Australia, presented by Dr. R. Broom; a Raven (*Corvus corax*), British, presented by Mr. William Soper; a Rook (*Corvus frugilegus*), British, presented by the Rev. A. Greaves; six Purplish Death Adders (*Pseudechis porphyriaca*), three Brown Death Adders (*Diemenia textilis*), six Short-headed Death Adders (*Hoplocephalus curtus*) from Australia, a Yellow-headed Conure (*Conurus jendaya*) from South-east Brazil, deposited; six Garter Snakes (*Tropidonotus ordinatus*), six Dekay's Snakes (*Ischnognathus dekayi*), three Spotted-headed Snakes (*Ischnognathus occipito-masculatus*), three Grass Snakes (*Cyclophis vernalis*), a Hog-nosed Snake (*Heterodon platyrhinos*) from Montreal, received in exchange; two Patagonian Cavies (*Dolichotis patachonica*), two Ypecaha Rails (*Aramides ypecaha*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

NOVEMBER METEORS.—With the July number of *Monthly Notices R.A.S.* a circular is issued by G. Johnstone Stoney, calling the attention of astronomers to the approach of the great secular maximum of the Leonids, which is due about 1899 or 1900. It is probable that this swarm was drawn into the solar system by the planet Uranus about February or March A.D. 126, and careful observations during the next few years may furnish materials for confirming or rejecting this hypothesis. Photography should be employed as widely as possible, and wherever practicable the time of appearance of each meteor recorded. Accurate simultaneous observations from different stations will be of exceptional use. The radiant-points and times of apparition of all meteors should be exactly noted, commencing a few nights before, and continuing some nights after, November 14 and 15.

PLUMB-LINE DEVIATIONS.—M. Messerschmitt, who has been for some time engaged in the determination of latitude and azimuths of a series of points in the Swiss Triangulation, has communicated (*Ast. Nach.*, No. 3365) the results of his most recent investigations. It may be recalled that M. Messerschmitt's first determinations were made in West Switzerland, and these were followed by further researches in the north of the country, which corroborated his previous results. The present paper is concerned with observations made on a line drawn approximately north and south through the centre. Collecting his results into a table showing the difference between geodetic and astronomical latitude, and arranged in order of increasing distance from the equator, a systematic deviation from the vertical is clearly shown. In the midst of the mountains (around Andermatt for example) these deviations are quite small. Going south they increase rapidly, and attain a negative maximum of 20″ (astronomical—geodetic) towards Lugano. A positive maximum occurs about Goschenen, the entrance to the Gotthard Tunnel; and still further north, the difference diminishes again, and changes sign about the latitude of Zürich. Schaffhausen shows again the position of negative maximum. The position of the mountain chains generally explains these variations.

An investigation, founded on these deviations of the plumb-line, of the form of the surface of the earth for a meridian length of about 200 km. through the Gotthard district, discloses the fact that the ellipsoid sinks everywhere below the geoid. Selecting as a zero point that position where no deviation from the vertical exists (47°·1 15′ lat.), the greatest difference between the two surfaces occurs near Airolo (the southern exit of the tunnel), where it amounts to nearly five metres. Going southwards from this point the surface sinks gradually, and approaches the ellipsoid before the valley of the Po is reached.

THE HAMBURG OBSERVATORY.—Prof. Rumker's report of the observatory work during the year 1895, shows that the activity of the various departments is fully maintained. The observations with the equatorial have mainly consisted in deriving the positions of small planets and comets, and of the fainter stars with which the nebulæ, whose places have been published in a communication from the observatory, have been compared. With smaller instruments attention has been given by Dr. Hänig to variable stars and occultations by the moon. With the meridian instrument, in addition to observations required for the accurate distribution of time signals, arrangements have been made for observing stars in the degree 80–81 N. Decln. down to 9·3 mag. In addition to this varied work, the attention of the staff has been called by Dr. Auwers and others to discrepancies between the places of stars in the Hamburg catalogue, and those recently obtained in the "Astronomischen Gesellschaft" zone catalogue. This has necessitated much searching of old records, and in some cases the detection of errors, which will be published in a communication from the observatory.

THE DUNSINK OBSERVATORY.—The seventh part of the astronomical observations and researches made at Dunsink, and published under the direction of Prof. Rambaut, contains the meridian places of 717 stars, of which upwards of 2000 observations have been made. These stars have been selected on account of suspected large proper motions, and the observations, interrupted as they have been from several causes, have been spread over eleven years. But, nevertheless, the accuracy maintained throughout is of a very high degree. From an examination of the separate results, the probable errors in R.A. and Declination are, respectively, ± 0″·037, and ± 0″·505. This error is probably increased by the uncertainty of the proper motion in many cases, and does not fully express the accuracy of the work. The Pistor and Martin's meridian circle, with which the observations have been made, has been frequently reversed in the course of the work, and the determination of latitude, on which great care has been bestowed, is slightly different in the two positions. With Clamp West the resulting latitude is 53° 23′ 13″·05, and with Clamp East three tenths of a second less. The value used in the final reduction is 53° 23′ 13″·00, and the results, it is believed, coincide very closely with Auwers' fundamental system. The cause of this systematic difference in the latitude, however, has not been satisfactorily explained.

OBSERVATORY OF MOSCOW.—The last issue of the *Annals* of this Observatory (series 2, vol. iii. part 2, 1896) contains several papers of general interest. The director, W. Ceraski, contributes the following articles: (1) "Photometry of the star cluster χ Persei," in which he gives the measures of the magnitude of seventy stars of the group, determined with a Zollner photometer on a 10-inch refractor. One star he finds to be variable, and recommends its further study. (2) "Observations of eclipses of Jupiter's satellites without photometric appliances," using eye estimates of relative magnitude compared with some neighbouring star of known brightness. (3) "On the temperature of the sun," in which he gives the inferior limit to be about 3500° C. (4) "A new method for the electrical comparison of pendulums."—P. Sternberg discusses the photographs he obtained during the transit of Mercury on May 9, 1891, and also contributes an important description of his determination of the variation of latitude at Moscow.—B. Modeston gives a full description of the calculation of double-star orbits by the methods of Kowalski and Encke respectively.—S. Blajko, as the result of thirteen photometric measures of the magnitude of Mira Ceti during the winter of 1894–5, finds evidence of a secondary maximum in its light curve, occurring about a month previous to the highest maximum, the magnitudes at the secondary and principal maxima being about 3·5 and 3·16 respectively.

THE SOLAR ECLIPSE OF APRIL 16, 1893.

M. DESLANDRES has now issued his report on the work accomplished by the French expedition to Fundium, Senegambia, for observations of the total solar eclipse of April 16, 1893. Some of the results obtained have already been made known, and these are now brought into connected order and discussed. A full account is also given of the general objects and organisation of the expedition. The programme decided upon included the photography of the corona, a photographic study of the coronal spectrum, especially in the ultra-violet, and a spectroscopic study of the movements of the corona.

The report is of special importance in view of the approaching eclipse, for the reason that reference is made to several points which may serve as a guide in future operations. For example, M. Deslandres' experience indicates that for the corona pictures plates of moderate sensitiveness give better results than the plates of greater rapidity. Another practical suggestion is that at least two cameras should always be employed in the search for an intra-mercurial planet; M. Deslandres found it impossible to determine whether certain spots on the single plate which he obtained represented stars or photographic defects.

The general results relating to the coronal spectrum are thus stated: (1) The continuous spectrum of the corona, which forms the greater part of its light, is most intense on the red side, relatively to the spectrum of the disc, and the difference appears to become greater as the point considered is further removed from the photosphere. (2) The spectrum of dark lines, under very favourable conditions, did not appear at 5′ from the sun's limb; at this height the light diffused by the coronal particles is still too feeble with respect to their own light. (3) The luminous gases of the corona, indicated by the fine lines, have not the same intensity or composition in different parts of